ON THE TERTIARY COAL AND FOSSILS OF OSINO, NEVADA.

By Edward D. Cope.

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The locality of the exposure of these coals is in the northeastern portion of Nevada, twenty-five miles northeast of Elko, on the Central Pacific Railroad. The outcrop is on the south side of the low mountain range, bounding Humboldt Valley on the north. The beds are exposed in a drift and adjacent cutting, and a shaft 200 feet in depth. The strata are argillaceous, and in some degree calcareous, and are very thinly laminated; so much so as to resemble thin brown or black paper in some portions of the series. They are highly carbonaceous, and burn freely; some of them with the odor of amber, which appears as a gloss on some of them. Descending sixty or more feet through these shales, we reach a bed of solid argillaceous material, of a dark green color. This can be removed with the pick, but hardens on exposure to the atmosphere. It contains fresh-water shells. The first bed of coal is two and a half feet in thickness, with one or two laminæ of slate. The second bed is twelve feet deeper, and is about three feet in thickness. In quality, both resemble cannel, but have more lustre.

Masses of the laminated shales resemble the *braun-kohle* of Bonn, Prussia, and they contain fossils disposed in the same way. These consist of multitudes of leaves, mostly of dicotyledonous plants; of molluscs, insects, and fishes; the last two often in a fine state of preservation. The molluscs present forms similar to *Planorbis*, *Vivipara*, etc. The insects are mostly Diptera, and some of them are Nematocera. The fishes are fresh-water forms, of which, perhaps, four species were procured. I have made an examination of two of these, and find them to represent both species and genera new to science. One of these is of interest, as furnishing the first evidence of the appearance of the *Catostomid* type, now so extended in North America; the other is allied to a genus which has been discovered in the Eocene shales of Green River.

The shales are considerably less indurated in general than those of Green River. They have been greatly disturbed by the elevation of the ranges bounding Humboldt Valley, as they dip nearly south, at an angle of forty-five degrees, at the mine.

The same shales are exposed in the ravines on the south side of the valley, dipping at one point where a drift has been run, at an angle of forty-five degrees to the northeast. They contain at this place plants and shells similar to those of the north range.

The descriptions of two of the species of fishes are appended, with remarks. Further investigation will, no doubt, determine the age of this series.

Extensive beds of a highly silicious amorphous rock appear near to these shales, one series being exposed in a nearly horizontal position in the valley, but little below the coal shales, and apparently occupying a higher horizon. They are filled with huge silicious concretions, and in many places assume the appearance of sandstone. Similar strata of sil-

icious rock cap the foot-hills of the range, forming their southern slopes with the southern dip, appearing to be nearly conformable to the shales. Their escarpments are to the northward, and the outcrops are fissured in every direction, the debris being scattered over the lower levels. On one of these rather elevated valleys I found abundant remains of the trunks of ancient forest trees, completely silicified. Many of the trunks must have measured five feet in diameter, and display the concentric laminæ of the dicotyledonous type. They were variously altered; some becoming chalcedony, and others opal; portions being black, red, yellow, purple, or white, of great purity.

At another outcrop of the silicious strata, a few miles distant from the above locality, the rock was found to be variegated by concentric bands of red, yellow, black, and white. Though fine in texture, it is not sufficiently translucent to constitute a valuable agate, which it otherwise resembles.

The connection between these silicious strata and the silicified wood seems apparent. The silica deposited in sufficient quantities to form strata of from twenty to forty feet in thickness, would suffice to impregnate submerged forests. That these strata are of sedimentary age is not settled, but they seem to be conformable to, and later than the tertiary shales just described.

TRICHOPHANES. Cope. Gen. nov.

Allied to *Erismatopterus*, Cope, and to the family of *Cyprinodontidæ*. Dorsal and anal fins short, each with a long and short spinous ray on the anterior margin. Ventrals beneath the dorsal. Operculum, with a longitudinal keel above. Mouth with wide gape, extending beyond orbit. Scales wanting, represented by rigid fringes or hair-like bodies.

Several important characters of this genus are not very distinctly displayed by the specimen described. This is especially the case with the maxillary region. The premaxillary bone evidently forms a large part of the arcade of the mouth, but whether the whole, is not certain. The presence of teeth, and number of branchiostegal radii, cannot be stated.

Other points, more definitely exhibited, are a preoperculum without serrations, directed a little obliquely backwards; a coracoid of little width; an inferior postclavicle with a superior (proximal) conchoidal expansion and long, slender shaft, extending to the anterior extremity of the femora. The latter are quite slender and acuminate anteriorly, and grooved to the apex, but apparently not furcate. They do not present any marked posterior union. Vertebræ not elongate.

Caudal fin furcate. Interneural spines wanting in front of dorsal fin; those of the anterior rays very strong. Interhæmals of the anterior anal rays similarly strong. Caudal fin embracing one vertebra, and supported by separated hæmal spines.

The characters which separate *Trichophanes* from *Erismatopterus*, are seen in the large mouth and short muzzle, and in the peculiar covering of the body. In the former character it resembles some of the *Scopeli*,

while the latter is not seen in any genus. The bristle-like bodies are scattered over the whole extent of the fish, excepting the head and the fins, and are arranged in little aggregations, which are irregularly disposed. The processes themselves lie irregularly together, as though free from each other, and are evidently not the impressions of keels of the scales. Traces of other scales are not visible, and the bodies described would suggest the existence of an ossified ctenoid fringe on a less fully calcified scale, or possibly without such basis.

TRICHOPHANES HIANS. Cope. Sp. nov.

Vertebræ, D. 9; C. 15; six between interneural spine of dorsal, and interhæmal of anal fin. Radii, D. II. (?) 6 (soft rays somewhat injured); A. II. 7; V. and P. not all preserved; caudal rays numerous, forming a deeply bifurcate fin. The ventrals reach a little over half way to the anal, and the latter about half way from its basis to that of the caudal fin. The dorsal fin, laid backwards, reaches the line of the base of the first anal ray. The first dorsal ray is a little nearer the end of the muzzle than the origin of the caudal fin. The muzzle is very obtuse, and if the specimen be not distorted, not longer than the diameter of the orbit. The gape extends at least to the posterior line of the orbit. The suborbital region deep posteriorly.

In its present somewhat distorted condition the specimen measures in

	M.
Total length	0.059
Head	.016
Vertebræ	.029
Caudal fin	.0142
Length dorsal spine	.008
" anal	.008
" of hair-like bodies	.0005

AMYZON. Cope. Genus novum Catostomidarum.

Allied to *Bubalichthys*. Dorsal fin elongate, with a few fulcral spines in front, and the anterior jointed rays osseous for a considerable part of the length. A few short osseous rays at front of anal fin. Scales cycloid. Caudal fin emarginate. Mouth rather large, terminal.

The characters of this genus appear to be those of the *Catostomidæ*. There are three broad branchiostegals. The vertebræ are short, and the hæmal spines of the caudal fin are distinct and rather narrow. In one specimen a pharyngeal bone is completely preserved. Not having it before me at the moment, I merely observe that it is slender, and with elongate inferior limb. The teeth are arranged comb-like, are truncate, and number about thirty to forty. This and other portions of the structure will be more fully described when the whole series of specimens is investigated. The bones bordering the mouth above are a little displaced, and the lower jaw projects beyond them, and is directed obliquely upwards. The dentary bone is slender and toothless, and the angular is

distinct. The premaxillary appears to extend beneath the whole length of the maxillary. Should this feature be substantiated, it will indicate a resemblance to Cyprinidæ. The maxillary has a high expansion of its superior margin, and then contracts towards its extremity. Above it two bones descend steeply from above, which may be out of position. The preoperculum is not serrate. The superior ribs are well developed.

This form approaches, in its anterior mouth, the true Cyprinidæ through *Bubalichthys*. It is the first extinct form of Catostomidæ found in this country.

AMYZON MENTALE. Cope. Species nova.

This fish occurs in considerable numbers in the Osino shales, and numerous specimens have been procured. Two only of these are before me at present. They are of nearly similar length, viz., M. O. .12 and .105. The most elevated portion of the dorsal outline is immediately in front of the dorsal fin. From this point the body contracts regularly to the caudal fin. The dorsal fin is long, and is elevated in front and concave in outline, the last rays being quite short. They terminate one half the length of the fin in front of the caudal fin. The interneural spines are stout in front and weak behind. Radii, III. 26, and (?) II. 23. There are about twenty-three vertebræ between the first interneural spine and the end of the series in the former specimen, in which, also, there are no distinct remains of scales. In the second, scales are preserved, but no trace of lateral line; there are six or seven longitudinal rows above the vertebral column. The anal fin is preserved somewhat damaged; the rays are not very long, and number II. 7. The anterior interhæmal is expanded into a keel anteriorly. Ventral fins injured.

The ribs and supplementaries are well developed. The inferior quadrate is a broad bone, with deep emargination for the symplectic. Depth No. 2 in front of dorsal fin, M .025. Length basis of dorsal, .026.

ON THE EXISTENCE OF DINOSAURIA IN THE TRANSITION BEDS OF WYOMING.

BY EDWARD D. COPE.

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During the present season, F. B. Meek, of Dr. F. V. Hayden's Geological Survey of the Territories, discovered some large bones near Black Buttes Station, on the Union Pacific Railroad, fifty-two miles east of Green River, and near the Hallville Coal Mines. Shortly afterwards I visited the spot with a branch expedition, and commenced excavations with a view to the recovery of the remainder of the animal. The position was discovered to be between the thinner or lower strata of the Bitter Creek series of coal, which at this point, occupy a position of elevation and crop out high on the bluffs. Two strata appear above the